

Amendments to the Drawings:

The attached Replacement Sheets, FIGS. 1-4 are formal drawings to replace original drawing FIGS. 1-5. FIG. 1 has been annotated with "Prior Art" per the Examiner's requirement. FIG. 2 is a single electron micrograph of a ladder-like structure according to the present invention replacing the original six views shown in original FIG. 2. FIG. 3 replaces original FIGS. 3 and 5 illustrating a slow wave structure formed by 180° folding of a first ladder-like structure over onto an identical and adjacent ladder-like structure formed from a single sheet of electroconductive material. FIG. 4 is a single electron micrograph of two ladder-like structures folded on top of each other according to the present invention, thus replacing the original six views shown in original FIG. 4. No new matter has been added.

REMARKS

The non-final Office Action mailed October 12, 2005, has been received and reviewed. As of the non-final Office Action, Claims 1-24 were pending in the application, of which Claims 3 and 5 are withdrawn from consideration. Applicants have amended Claims 1-2, 4, 6, 15 and 18. Applicant hereby deletes without prejudice the previously withdrawn Claims 3 and 5, expressly reserving the right to file divisional applications including those claims and directed to the inventions identified in the Restriction/Election. As of this AMENDMENT AND RESPONSE, Claims 1-2, 4 and 6-24 remain in the case and are believed to be in condition for allowance.

Drawings Objection

The Examiner has objected to the drawings under 37 C.F.R. § 1.83(a). Specifically, the Examiner asserts that all of the drawings require replacement formal drawings. The Examiner further asserts that FIG. 1 must be designated as "Prior Art". Finally, the Examiner has objected to FIG. 3 because it does not clearly show the structure Applicant is attempting to illustrate and FIG. 5 shows two views of the same object and, thus, each view requires its own FIG. number.

Applicants submit herewith, formal drawing FIGS. 1-4 correcting the informalities cited by the Examiner. No new matter has been added. Applicant respectfully requests reconsideration of the objection to the drawings based on the above amendments.

Claim Objections/Informality

The Examiner has objected to Claim 4 because of redundant claim limitations. Applicants have amended Claim 4 to eliminate the redundant claim limitations, accordingly. Applicants have further amended Claim 4 to include the limitation "folding the etched sheet 180° along a hinge line onto itself to form the ladder-type device," see related discussion below.

35 U.S.C. § 112, ¶ 2 Indefiniteness Rejection

The Examiner has rejected Claims 1, 2, 6-13, 15, 16, 18, 19 and 22-24 under 35 U.S.C. § 112, ¶ 2 as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Applicants have amended Claims 1, 2, 6, 15 and 18 as further elaborated below.

Regarding Claim 1, the Examiner asserts that it is unclear how the pair of ladder-like structures can be integrally formed on a single sheet of electroconductive material and simultaneously having a hinge joint formed between them. The Examiner further asserts that Claims 2, 15 and 18 have similar structural recitations and are asserted to be vague and indefinite for the same reasons.

Applicants have amended Claim 1 to clarify the hinge joint limitation as it relates to the single sheet of electroconductive material. More specifically, amended Claim 1 now recites “a hinge joint is formed parallel to the rails of said ladder-like structures by folding 180° along a hinge line separating said ladder-like structures” added limitation underlined. Applicants have further amended Claim 1 to correct minor errors in antecedent basis.

Similarly, Applicants have amended Claim 2 to recite “[a] pair of ladder-like structures positioned in register with one another to form a tunnel therebetween wherein said structures are integral with one another by folding 180° along a hinge joint axis parallel to the longitudinal axis of said tunnel” added limitation underlined.

Regarding Claim 15, Applicants have amended Claim 15 to recite “wherein said precise miniature ladder-type device is configured to be folded 180° along a hinge line to form a rigid structure having a defined cross-section” added limitations underlined.

Furthermore, Applicants have amended Claim 18 to recite “further comprising folding 180° along a hinge line formed between two half-structures of the ladder-like structure” added limitations underlined.

The Examiner further asserts that Claims 6 and 18 are indefinite because they both recite the phrase “with through linear bore.” Applicants have amended Claims 6 and 18 to more clearly define the claimed inventions. Specifically, Applicants have

amended Claims 6 and 18 to recite “an elongated cavity configured as a linear bore” added limitations underlined.

In light of these amendments to more clearly define the claimed inventions, Applicant respectfully requests reconsideration of the indefiniteness rejection of Claims 1, 2, 6-13, 15, 16, 18, 19 and 22-24 under 35 U.S.C. § 112, ¶ 2.

35 U.S.C. § 102(b) Anticipation Rejections

Anticipation Rejection Based on U.S. Patent No. 3,322,996 to Schrager

Claims 1-2, 6-8, 13 and 22-24 stand rejected under 35 U.S.C. § 102(b) as being anticipated by Schrager. The standard for anticipation as set forth by the Court of Appeals for the Federal Circuit is as follows:

A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference. *Verdegaal Brothers v. Union Oil Co. of California*, 2 U.S.P.Q.2d 1051, 1053 (Fed. Cir. 1987). The identical invention must be shown in as complete detail as is contained in the claim. *Richardson v. Suzuki Motor Co.*, 9 U.S.P.Q.2d 1913, 1920 (Fed. Cir. 1989).

Schrager appears to disclose a ladder-like structure. However, Schrager does not disclose “a hinge joint is formed parallel to the rails of said ladder-like structures by folding 180° along a hinge line separating said ladder-like structures” as recited in amended Claim 1, added limitation underlined. Schrager has no hinge line upon which a “pair of self-alignable, ladder-like structures” may be folded “180°.” Rather, the integral metal ladder-like structure of Schrager is configured for bending into a cylindrical ring and bar slow wave structure 41 as shown in FIG. 7 using the machines shown in FIGS. 2-6. Claims 6-8 and 13 depend from amended Claim 1 and, thus, are believed to be unanticipated for the same reasons as Claim 1.

Regarding Claim 2, Applicants have amended Claim 2 to recite the limitation “wherein said structures are integral with one another by folding 180° along a hinge joint axis” added limitation underlined. As noted above, Schrager fails to disclose “folding 180°.” Claims 22-24 depend from amended Claim 2 and, thus, are believed to be unanticipated for the same reasons as Claim 2.

For these reasons, Applicant believes that Claims 1-2, 6-8, 13 and 22-24 as amended are not anticipated by Schrager. Applicant respectfully requests reconsideration of the anticipation rejection of Claims 1-2, 6-8, 13 and 22-24 based on Schrager.

Anticipation Rejection Based on U.S. Patent No. 3,508,108 to Salisbury

Claims 1-2, 4, 6-8, 14-20, 22 and 23 stand rejected under 35 U.S.C. § 102(b) as being anticipated by Salisbury. Like Schrager, Salisbury teaches cylindrical slow wave structures formed from flat photoetched circuits to be bent around a longitudinal axis to form a slow wave circuit. Col. 2, Lines 48-50. Nowhere in Salisbury is 180° folding of opposed ladder-like structures disclosed as recited in amended Claims 1-2 and 4. Claims 6-8, 14-20, 22 and 23 all depend from amended independent Claims 1-2 and 4 and are thus believed to unanticipated by Salisbury.

For these reasons, Applicant believes that Claims 1-2, 4, 6-8, 14-20, 22 and 23 as amended are not anticipated by Salisbury. Applicant respectfully requests reconsideration of the anticipation rejection of Claims 1-2, 4, 6-8, 14-20, 22 and 23 based on Salisbury.

35 U.S.C. § 103(a) Obviousness Rejections

Obviousness Rejection Based on U.S. Patent No. 3,322,996 to Schrager in view of U.S. Patent No. 4,178,533 to Ribout et al. or U.S. Patent No. 4,949,047 to Hayward et al.

The Examiner has rejected Claims 9-11 under 35 U.S.C. § 103(a) as being unpatentable over Schrager in view of either Ribout et al. or Hayward et al. M.P.E.P. 706.02(j) sets forth the standard for a Section 103(a) rejection:

To establish a *prima facie* case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations. The teaching or suggestion to make

the claimed combination and the reasonable expectation of success must both be found in the prior art, and not based on applicant's disclosure. *In re Vaeck*, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991), emphasis added.

Claims 9-11 depend from Claim 7 which in turn depends from amended Claim 1. As amended Claim 1 is now believed to be unanticipated by Schrager (see arguments above) the base reference of Schrager in combination with either Ribout et al. or Hayward et al. asserted by the Examiner fails the third prong of the obviousness test because the combination fails to teach all of the limitation recited in amended Claim 1. None of the cited references, Schrager, Ribout et al. and Hayward et al. disclose "a hinge joint is formed parallel to the rails of said ladder-like structures by folding 180° along a hinge line separating said ladder-like structures" as recited in amended Claim 1, added limitation underlined.

For all of these reasons, Applicant asserts that Claims 9-11 are nonobvious over the asserted combination of Schrager in view of either Ribout et al. or Hayward et al. Applicant respectfully requests reconsideration of the obviousness rejection of Claims 9-11 based on Schrager in view of either Ribout et al. or Hayward et al.

Obviousness Rejection Based on U.S. Patent No. 3,322,996 to Schrager in view of U.S. Patent No. 2,957,103 to Birdsall

The Examiner has rejected Claim 12 under 35 U.S.C. § 103(a) as being unpatentable over Schrager in view of Birdsall. Claim 12 depends from Claim 7 which in turn depends from amended Claim 1. Furthermore, because amended Claim 1 is believed to be unanticipated by Schrager, see above § 102(b) arguments, Claim 12 is further believed to be nonobvious in combination with Birdsall for the same reasons. Neither Schrager nor Birdsall disclose "a hinge joint is formed parallel to the rails of said ladder-like structures by folding 180° along a hinge line separating said ladder-like structures" as recited in amended Claim 1, added limitation underlined.

For all of these reasons, Applicant asserts that Claim 12 is nonobvious over the asserted combination of Schrager in view of Birdsall. Applicant respectfully requests

reconsideration of the obviousness rejection of Claim 12 based on Schragger in view of Birdsall.

Obviousness Rejection Based on U.S. Patent No. 3,508,108 to Salisbury in view of U.S. Patent No. 4,178,533 to Ribout et al. or U.S. Patent No. 4,949,047 to Hayward et al.

The Examiner has rejected Claims 9-11 under 35 U.S.C. § 103(a) as being unpatentable over Salisbury in view of either Ribout et al. or Hayward et al. Claims 9-11 depend from Claim 7 which in turn depends from amended Claim 1. As amended Claim 1 is now believed to be unanticipated by Salisbury (see arguments above) the base reference of Salisbury in combination with either Ribout et al. or Hayward et al. asserted by the Examiner fails the third prong of the obviousness test because the combination fails to teach all of the limitation recited in amended Claim 1. None of the cited references, Salisbury, Ribout et al. and Hayward et al. disclose "a hinge joint is formed parallel to the rails of said ladder-like structures by folding 180° along a hinge line separating said ladder-like structures" as recited in amended Claim 1, added limitation underlined.

For all of these reasons, Applicant asserts that Claims 9-11 are nonobvious over the asserted combination of Salisbury in view of either Ribout et al. or Hayward et al. Applicant respectfully requests reconsideration of the obviousness rejection of Claims 9-11 based on Salisbury in view of either Ribout et al. or Hayward et al.

Obviousness Rejection Based on U.S. Patent No. 3,508,108 to Salisbury in view of U.S. Patent No. 2,957,103 to Birdsall

The Examiner has rejected Claim 12 under 35 U.S.C. § 103(a) as being unpatentable over Salisbury in view of Birdsall. Claim 12 depends from Claim 7 which in turn depends from amended Claim 1. Furthermore, because amended Claim 1 is believed to be unanticipated by Salisbury, see above § 102(b) arguments, Claim 12 is further believed to be nonobvious in combination with Birdsall for the same reasons. Neither Salisbury nor Birdsall disclose "a hinge joint is formed parallel to the rails of said

ladder-like structures by folding 180° along a hinge line separating said ladder-like structures” as recited in amended Claim 1, added limitation underlined.

For all of these reasons, Applicant asserts that Claim 12 are believed to be nonobvious over the asserted combination of Salisbury in view of Birdsall. Applicant respectfully requests reconsideration of the obviousness rejection of Claim 12 based on Salisbury in view of Birdsall.

Obviousness Rejection Based on U.S. Patent No. 3,508,108 to Salisbury in view of U.S. Patent No. 3,322,996 to Schrager

The Examiner has rejected Claim 13 under 35 U.S.C. § 103(a) as being unpatentable over Salisbury in view of Schrager. Claim 13 depends from Claim 7 which in turn depends from amended Claim 1. Furthermore, because amended Claim 1 is believed to be unanticipated by either Salisbury or Schrager, see above § 102(b) arguments, Claim 13 is further believed to be nonobvious for the same reasons. Neither Salisbury nor Schrager disclose “a hinge joint is formed parallel to the rails of said ladder-like structures by folding 180° along a hinge line separating said ladder-like structures” as recited in amended Claim 1, added limitation underlined.

For all of these reasons, Applicant asserts that Claim 13 is nonobvious over the asserted combination of Salisbury in view of Schrager. Applicant respectfully requests reconsideration of the obviousness rejection of Claim 13 based on Salisbury in view of Schrager.

Obviousness Rejection Based on U.S. Patent No. 3,508,108 to Salisbury in view of U.S. Patent No. 2,957,103 to Birdsall or U.S. Patent No. 3,322,996 to Schrager

The Examiner has rejected Claims 21 and 24 under 35 U.S.C. § 103(a) as being unpatentable over Salisbury in view of Birdsall or Schrager.

Claim 21 depends from Claim 20 which in turn depends from amended Claim 4. Because amended Claim 4 is believed to be unanticipated by Salisbury, see above § 102(b) arguments, Claim 21 is also believed to be nonobvious over Salisbury in

combination with Birdsall or Schrager for the same reasons. None of the cited references Salisbury, Birdsall or Schrager disclose "folding the etched sheet 180° along a hinge line onto itself to form the ladder-type device," as recited in amended Claim 4, added limitation underlined.

Claim 24 depends from Claim 22 which in turn depends from amended Claim 2. Because amended Claim 2 is believed to be unanticipated by Salisbury, see above § 102(b) arguments, Claim 24 is also believed to be nonobvious over Salisbury in combination with Birdsall or Schrager for the same reasons. None of the cited references Salisbury, Birdsall or Schrager disclose "wherein said structures are integral with one another by folding 180° along a hinge joint axis," as recited in amended Claim 2, added limitation underlined.

For all of these reasons, Applicant asserts that Claims 21 and 24 are believed to be nonobvious over the asserted combination of Salisbury in view of Birdsall or Schrager. Applicant respectfully requests reconsideration of the obviousness rejection of Claims 21 and 24 based on Salisbury in view of Birdsall or Schrager.

CONCLUSION

As of this AMENDMENT AND RESPONSE, Claims 1-2, 4 and 6-24 are believed to be in condition for allowance. Should the Examiner determine that additional issues remain which might be resolved by a telephone conference, he is respectfully invited to contact Applicants' undersigned attorney.

The Commissioner is hereby authorized to charge any additional fee or to credit any overpayment in connection with this AMENDMENT AND RESPONSE to Deposit Account No. 50-0881.

Respectfully Submitted,



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Enclosure: Replacement Formal Drawing FIGS. 1-4